NATIONAL ENERGY BOARD

REASONS FOR DECISION

In the Matter of an Application under
the National Energy Board Act

of

Dow Chemical of Canada, Limited

June 1979

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Ce rapport est publié
séparément dans les deux
langues officielles.

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ABBREVIATIONS USED IN THE REPORT

For Units of Measurement:

GW.h	: gigawatt-hour (1 000 000 kW.h)
kW.h	: kilowatt-hour
MW	: megawatt (1 000 kilowatts)

For Names:

Applicant	: Dow Chemical of Canada, Limited
Board	: National Energy Board
Consumers	: Consumers Power Company, Michigan U.S.A.
Dow - Canada	: Dow Chemical of Canada, Limited
Dow - Sarnia	: Dow Chemical of Canada, Limited Sarnia Division
Dow - Midland	: Dow Chemical U.S.A., Midland, Michigan, U.S.A.
Edison	: The Detroit Edison Co.
NEB	: National Energy Board
Union	: Union Gas Limited

NATIONAL ENERGY BOARD

IN THE MATTER OF an application by Dow Chemical of Canada, Limited for a licence to export energy under Part VI of the National Energy Board Act.

(File 1923-D4-1)

HEARD at Ottawa, Ontario on 29 and 30 May 1979

BEFORE:	R.F. Brooks	Presiding Member
	J.L. Trudel	Member
	R.B. Horner	Member

APPEARANCES:

Hugh A. Fergusson	Dow Chemical of Canada, Limited
R.E. Rowcliffe	Chippewas of Sarnia
Andrew Mudryj	Union Gas Limited
K.H. Kidd	Leighton & Kidd Limited
Stephen J. Kawalec	On his own behalf
Sandra Fraser	National Energy Board

BACKGROUND

The Applicant, Dow Chemical of Canada, Limited (Dow - Canada) is a federally incorporated company established in 1942 to build and operate a styrene manufacturing plant for Polymer Corporation Limited, in its wartime synthetic rubber program, in Sarnia, Ontario. Since 1946, Dow - Canada has developed a major petrochemical undertaking in Canada with plants in British Columbia, Alberta, Ontario and Quebec. Dow - Canada is actively engaged in the exploration for and production of petroleum hydrocarbons and through its chemical operations is a large consumer of hydrocarbons including those derived from gas and oil.

Dow - Canada and Dow Chemical U.S.A. (Dow - Midland), the customer for the proposed export, are wholly-owned subsidiaries of The Dow Chemical Company. The Dow Chemical Company is a corporation engaged in the manufacturing and processing of primary chemicals with corporate head offices and major production facilities located at Midland, Michigan.

The Sarnia plant is located in an area where costs of energy conventionally supplied from utility sources would be as much as twice those of some of Dow-Canada's competitors located on the United States Gulf Coast. Furthermore steam and electric energy costs could be 45 to 50 per cent of the operating costs of some of the process plants. Accordingly, in order to provide competitive energy costs for the Sarnia

Division, the Applicant in 1972, installed two gas-fired combined-cycle generators. This co-generation plant provided a high thermal efficiency ranging up to 83 per cent compared with a normal efficiency of approximately 38 per cent for a conventional thermal generating station. As a result the Applicant was able to establish competitive world scale facilities for the production of chlorine and caustic soda; these began operation in 1973 and a low density polyethylene plant commenced operations in October of 1978. In 1977, the addition of a third gas turbine generator unit increased the total nominal generating capacity to 243 MW. Natural gas is the main fuel used for generation and is purchased from Union on an interruptible basis.

THE APPLICATION

Dow - Sarnia is applying for a licence to export surplus, interruptible energy for the period 1 June 1979 to 31 December 1982. The quantity of energy to be exported would not exceed 438 GW.h for each calendar year 1980, 1981 and 1982 and 255 GW.h for the calendar year 1979. At the hearing the 1979 quantity was revised; the Applicant's technical witness stated that a proportional formula based on the remainder of 1979 could be used. The exports could commence at any time after 1 June 1979.

The energy to be exported would be surplus to the requirements of the Applicant's Sarnia operation until at least June, 1983. It would be produced from generating capacity made surplus by the fact that an expected increase in demand for chemicals had failed to materialize. The surplus energy would be sold to Dow - Midland. At present the surplus is usually sold to Ontario Hydro.

As Dow - Sarnia does not own any transmission facilities the proposed exports would be "wheeled" (i.e. transmitted) over three Ontario Hydro international power lines located in the Sarnia area. On the American side the energy would be wheeled through the Detroit Edison Co. (Edison) and Consumers Power Company (Consumers) systems. Appendix 1 is a map showing the location of the Dow - Sarnia and the Dow - Midland plants.

EVIDENCE

The Applicant generates all its energy requirements for its operation in the Sarnia Division. The third gas turbine was installed in 1977 in anticipation of predicted chemical plant expansion which did not materialize. Due to the lack of growth, Dow - Sarnia finds itself with surplus capacity, and is requesting a licence to export an average quantity of 50 MW and the associated energy, 438 GW.h per year, that can be used on an interruptible basis by Dow - Midland at its Midland, Michigan complex.

The large users of power at the Dow - Sarnia site are the two chlorine facilities. They are currently operating at maximum capacity and no change is foreseen to the end of 1982. The surplus power could not, therefore, be used to create more jobs within the Sarnia Division. As Dow - Sarnia's business expands, the energy will be used in Canada and not exported to the U.S.A.; however there must be a major expansion before the excess power can be used. The policy witness testified that Dow - Canada was expecting to make a profit by selling power to Dow - Midland and at the same time maintaining a high efficiency operation of its plant.

Agreements

In support of its case, Dow - Sarnia filed the following agreements:

1. Agreement dated 2 March 1979 between Dow - Sarnia and The Dow Chemical Company as amended 24 May 1979. This is a sales contract under which the Applicant will sell and Dow - Midland will purchase interruptible energy associated with an average of 50 MW of power, on an "at will" basis. The basic price set forth in this agreement is 24.3 mills per kilowatt-hour in U.S. currency and it will be adjusted as provided in the agreement. The agreement is to come into effect on the later of 1 June 1979, or the date upon which all requisite approvals are obtained, and is to be in effect until 31 December 1982 or such date as is agreed upon by the parties.
2. Wheeling agreement dated 24 May 1979 between Dow Chemical of Canada (Dow - Sarnia) and Ontario Hydro. This agreement defines the terms and conditions under which Ontario Hydro agrees to wheel the energy from Dow - Sarnia to the border. The wheeling charges are 2.6 mills per kilowatt-hour in Canadian currency with provision for adjustment by Ontario Hydro on 30 days notice.

   Under this agreement Ontario Hydro reserves the right to purchase, for its own needs, the energy scheduled for export at the same rate as Dow - Midland would pay. Ontario Hydro also reserves the right to purchase energy surplus to the export. The price to be paid for any surplus energy is to

be calculated using the formula shown in a Letter of Agreement dated 10 August 1972. The agreement is to be in effect until 31 December 1982, unless terminated earlier as provided in the agreement.

3. Agreement dated 25 May 1979 between The Detroit Edison Company and The Dow Chemical Company to cover the wheeling of the proposed export.
4. Transmission Agreement dated 25 May 1979 between Consumers Power Company and The Dow Chemical Company to cover the wheeling of the energy to be exported by Dow - Sarnia.
5. Electric Coordination Agreement dated 5 January 1979 between The Detroit Edison Company and Consumers Power Company.
6. Interconnection Agreement dated 29 January 1975 between Consumers Power Company, The Detroit Edison Company and Ontario Hydro.

Surplus

To demonstrate that the proposed export would be surplus to its foreseeable requirements, the Applicant provided monthly forecasts of power and energy usage showing an expected surplus in every month throughout the requested licence period. Appendix 2 summarizes these forecasts. This surplus energy is currently sold to Ontario Hydro whenever it requests it. Any future load growth or loss of generation at Dow - Sarnia would result in a cut-back of any delivery to Dow - Midland.

On 28 February 1979, the Applicant sent a letter to Ontario Hydro offering interruptible energy for sale under the same conditions and at the same price as Dow - Midland would pay. Ontario Hydro replied by letter dated 8 May 1979 that it had no objection to the granting of the application provided that any licence which was issued be conditioned to require that priority be given to Canadian requirements.

Export Market and Prices

The American customer, Dow - Midland currently generates two-thirds of its power requirements and purchases the rest from Consumers. It also has an agreement to buy most of its power and energy requirements from Consumers beginning in 1982. A Dow - Midland witness testified that the power would come from the Consumers electric power grid that serves Dow - Midland and that the contract would go into effect upon the commencement of commercial operation of Consumers' Midland 1 nuclear unit. Midland is a nuclear station under construction near the Dow - Midland complex, scheduled to be completed by December 1982.

The energy to be exported under the requested licence would be in accordance with the agreement of 2 March 1979 between Dow - Sarnia and Dow - Midland as amended by the letter of 24 May 1979. The rate is 24.3 mills per kilowatt-hour in U.S. currency with a provision for escalation throughout the term of the agreement. The price would be escalated based on

the greater of any increase in the total cost incurred in Canada, including fuel cost, or any increase in the price of electricity if supplied by Consumers.

To justify the export price of 24.3 mills/kW.h, the Applicant provided evidence on its relationship to the three standard criteria established by the Board.(1)

To show that the price would recover its appropriate share of the costs incurred in Canada (the first criterion), the Applicant provided detailed calculations showing an estimate of the total cost (based on 1979 costs) and the total revenue throughout the requested period of the licence. The total cost includes incremental cost of generation, losses, wheeling charges paid to Ontario Hydro and capital cost incurred for installing new equipment. The total revenue includes revenue from the sales to Dow - Midland and from additional energy, termed "buffer energy", sold to Ontario Hydro. This "buffer energy" would ensure that the energy supplied to Ontario Hydro would not drop below the scheduled export. The excess of revenue over costs could amount to some $15 million if 1 569.5 GW.h were to be exported. Dow - Sarnia estimated its average incremental cost to be 14.0 mills/kW.h including fuel at maximum rate under Union's Rate 7 plus the wheeling charge of 2.6 mills/kW.h; thus the total incremental cost for the proposed export would be 16.6 mills per kilowatt-hour. A detailed calculation of cost and revenue is shown in Appendix 3. The

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(1) The Board's three standard price criteria appear as items (i), (ii) and (iii) of paragraph 6(2) (z) in the NEB Part VI Regulations as amended in 1973.

Applicant added that the export price would be adjusted in accordance with the escalation agreement to maintain the difference between cost and revenue.

Dow - Sarnia has no regular customer for power but to demonstrate that the export price would not be less than the price to Canadians for equivalent service in related areas (the Board's second criterion), it provided evidence based on Ontario Hydro rates (proposed for 1979). For supplying power classified as Interruptible 'A', its highest interruptible rate to direct customers, Ontario Hydro charges an average rate of 16.5 mills per kilowatt-hour. Furthermore, Dow - Sarnia offered the proposed export to Ontario Hydro at the price that Dow - Midland would pay minus the wheeling charges; and the "buffer energy" and any additional surplus could be purchased by Ontario Hydro according to the incremental-cost-sharing formula. Dow - Sarnia estimated the current price paid by Ontario Hydro to be 13.1 mills per kilowatt-hour.

To show that the export price of 24.3 mills/kW.h (U.S. currency) would not result in prices in the U.S. being materially less than the least-cost alternative available to the buyer (the third criterion), the Applicant provided evidence based on existing Consumers' rates. The price, 24.3 mills/kW.h, that Dow - Midland agreed to pay is equivalent to the price it would be paying if it were buying firm energy from Consumers.

According to testimony Consumers does not offer interruptible power.

Environmental Impact

The basic fuel used to produce the energy proposed to be exported is gas; however fuel oil may be burned in some cases.

To demonstrate the environmental impact of the proposed export the Applicant provided a copy of the "Air Management Application" which was submitted to the Ontario Ministry of the Environment for approval to operate the Dow-Sarnia plant with the third gas turbine generator unit in service. This document showed that, assuming maximum plant output and the worst conditions of fuel and wind direction, ground level concentrations of contaminants (SO_2 and NO_x) were within the Ontario government standards for maximum concentrations. Other evidence provided the corresponding one-hour, 24-hour and annual levels which would be within the federal government objectives for maximum acceptable concentrations. The Air Management Application also stated that there would be no visible particulate emission from the new facilities.

INTERVENTIONS

Four interventions relative to the application were received.

The Chippewas of Sarnia

The Band claimed to be an interested party to this application on the basis that if the Applicant is utilizing gas from a reef that lies in part under Reserve lands, the Applicant is then extracting and consuming gas to which, in part, the Band is entitled.

At the beginning of the hearing, the Counsel for the intervenor said "the interest, if any, which my clients, The Chippewas of Sarnia, have in this application, to my mind, is somewhat in doubt." He also added that the hearing might not be the proper forum in which to express his concerns. However he raised a question regarding the legality of using transmission line B3N for wheeling energy exported on behalf of a party other than Ontario Hydro. The said line traverses, by right of easement, part of the river range of the Chippewas' land in Sarnia.

Mr. Stephen J. Kawalec, P. Eng.

Mr. Kawalec, a resident of the City of Chatham, Ontario, submitted a written intervention and elaborated on it at the hearing through cross-examination of witnesses and presentation of a final argument.

As a gas user in the Union service area Mr. Kawalec voiced his concern over the price to be paid by the Applicant for the gas used to generate the proposed export. He felt that the Canadian interest in this application resides with the gas utility, Union, and consequently with its gas customers who pay the cost of service. In his view additional justifiable revenue realized from the sale of gas used for exporting energy, would relieve Ontario gas users of cost of service increases.

Union Gas Limited

Union, in its intervention, supported the Applicant and was represented at the hearing.

Leighton & Kidd Limited, Consulting Engineers

This intervenor supported the application, while noting several peripheral considerations raised by the proposed export. Mr. Kidd attended the hearing, cross-examined the witnesses and participated in the final argument.

DISPOSITION

The Board has given careful consideration to all the evidence and submissions presented to it, and is prepared to grant the application.

Section 83 of the Act requires that the Board, in examining an application for an export licence, have regard for all considerations that appear to it to be relevant. Without limiting the generality of the foregoing, the Board is required to satisfy itself that the energy to be exported is surplus to reasonably foreseeable Canadian requirements and that the price to be charged is just and reasonable in relation to the public interest.

In the consideration of surplus, it is necessary to examine both capacity and energy.

The Applicant operates its generation facilities at maximum output to obtain the best efficiency consistent with its requirements for process steam. Operation at maximum output results in the generation of electric power which is surplus to the Applicant's internal needs as shown in Appendix 2; the sale of this power, currently to Ontario Hydro, makes this high efficiency operation feasible. The Applicant wants to export its surplus power and energy, having obtained a price not usually available from Ontario Hydro. The magnitude of the available surplus capacity and of the corresponding energy surplus are more than sufficient to meet the requested licence limits. The duration of the period of surplus should extend even beyond the requested licence term.

The Applicant has no customers of its own for electrical energy and has offered the energy to Ontario Hydro on the same terms as the proposed export. Ontario Hydro stated that they would not normally purchase this energy, but might wish to buy it if the capacity were required or the price were economically attractive.

The Board has, therefore, concluded that the energy is surplus to reasonably foreseeable Canadian requirements and that the interruptible nature of the export would safeguard the Canadian interest.

The evidence shows that the surplus energy would not be used by the Applicant within the proposed licence term. If Dow-Sarnia's production increased, any corresponding increase in energy requirements could be provided by backing off the interruptible exports. The proposed export would thus not affect the number of jobs available to Canadians.

To demonstrate that the export price is just and reasonable in relation to the public interest, the Applicant has shown that the Board's three price criteria are satisfied. As to the first criterion, that the price shall recover its appropriate share of the costs incurred in Canada, the Applicant demonstrated that, using the highest price for natural gas which could be charged by Union under the present rate structure, the

revenue would recover all costs associated with the export of energy and provide profit. This is shown in Appendix 3. To satisfy the second criterion, that the price shall not be less than that charged to Canadians for equivalent service, the Applicant, which has no direct customers, has shown that the price is higher than the cost of equivalent service from Ontario Hydro. To satisfy the third criterion, that the price shall not be materially less than the U.S. customer's least-cost alternative, the Applicant demonstrated that the price would be as high or higher than that currently paid to Consumers by Dow-Midland for its present power supply. In addition, the export agreement as amended in the letter of 24 May 1979 includes an escalation clause which ensures that the export price will continue to meet the Board's price criteria throughout the licence term. Finally, the Applicant indicated that it would not cause Dow-Sarnia hardship if the licence contained a condition that the price to be charged for the energy exported be greater than the incremental cost of production calculated using the export price of natural gas. In this way it would be ensured that the recipient of the proposed export would not benefit from Canadian subsidies to control internal prices of natural gas. This condition should be included in the licence.

Regarding the environmental impact of the export, the evidence showed that, with the plant operating at maximum load and using the worst combination of fuels, the half-hour ground level concentration of contaminants would be within the

applicable provincial standards. The corresponding one-hour, 24-hour and annual ground level concentrations would be within the federal standards for maximum acceptable concentrations. Finally, since the evidence has shown that the plant is normally run at maximum load with or without export, there would be no material incremental environmental impact due to the proposed export.

Dealing now with points raised in the various interventions, the Board finds as follows:

(a) Regarding the concern of the Chippewas of Sarnia that the energy for export would at times be produced using natural gas from a reservoir which may be located under their land, the Board is not the correct forum to decide the ownership of the gas. The Intervenor's concern about the source of natural gas used to generate the energy for export is resolved by the Applicant's statement that it would not export when using natural gas from local supplies.

(b) The possibility that the easement given by the Chippewas of Sarnia to Ontario Hydro for transmission line B3N would conflict with its use to wheel energy for the Applicant is not a problem for consideration by the Board.

(c) Regarding Mr. Kawalec's intervention, the actual price, as distinct from the maximum price, paid by the Applicant for natural gas is not a consideration on which the disposition of the application hinges. The evidence has shown that the price to be charged for electrical energy would recover the costs incurred in Canada even if gas used to generate that energy were being purchased at the highest price Union is permitted to charge.

Having had regard to all considerations that appeared to it to be relevant, the Board is prepared to issue a licence for the export of interruptible energy subject to the terms and conditions set out in Appendix 4.

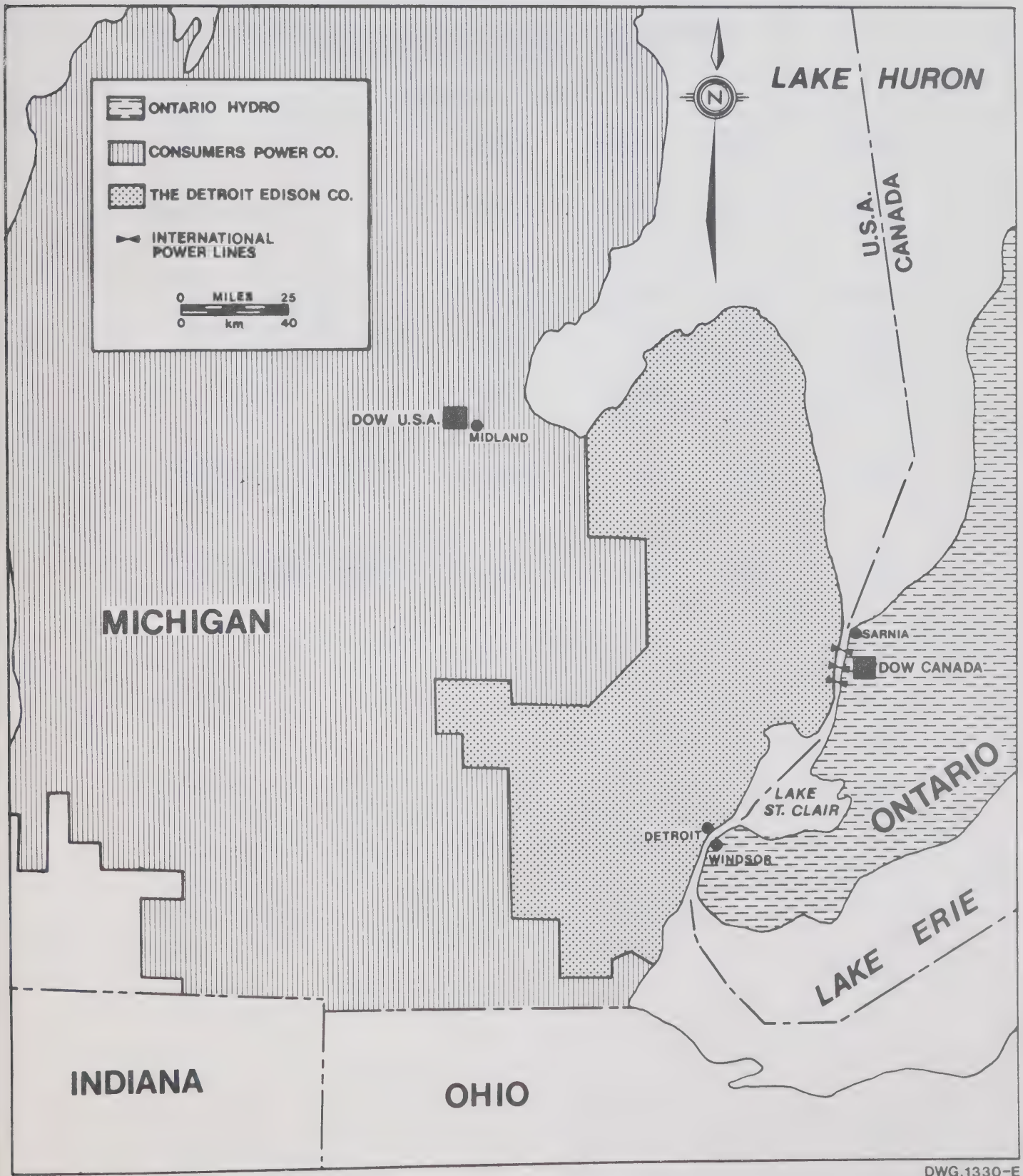
Presiding Member

Member

Member

Ottawa, Canada
June, 1979

DOW CHEMICAL COMPANY LIMITED
ELECTRICITY–GENERATING FACILITIES
SARNIA, ONTARIO & MIDLAND, MICHIGAN



NATIONAL ENERGY BOARD, APR. 1979

DWG.1330-E

APPENDIX 2

Dow Chemical of Canada, Limited

Dependable Energy Capabilities, Load, Surplus and Proposed Export

Gigawatt-hours

		1979	1980	1981	1982
1.	Capability[1]	2047	2047	2047	2047
2.	Load:				
	Dow - Canada	1334	1356	1380	1403
	Interruptible sales to Ontario Hydro	282	73	47	20
	Total Load	1616	1429	1427	1423
3.	Surplus to Canadian requirements	431	618	620	624
4.	Interruptible Export (proposed maximum)	255	438	438	438

(1) Net dependable energy capability

DOW CHEMICAL OF CANADA, LIMITED

ESTIMATED TOTAL COST AND REVENUE OF EXPORT ENERGY
(Based on 1979 Costs)

INCREMENTAL COST OF GENERATION

(1)	mills/kW.h
Fuel	11.35
Maintenance	0.60
Other variable	1.87
Sub-total	13.82
System losses at 1.3%	0.18
Total	14.00

COST OF ENERGY SOLD

1 569 500 000 kW.h to Dow - Midland(2) 94 170 000 kW.h to Ontario Hydro (Buffer)(3) 1 663 670 000 kW.h @ 14.0 mills	$23 299 380
Wheeling cost paid to Ontario Hydro 1 569 500 000 kW.h @ 2.6 mills	4 080 700
Capital cost incurred in Canada(metering & controls)	50 000
Total	$27 430 080

REVENUE FROM EXPORT SALES

1 569 500 000 kW.h exported @ 27.2 mills (Canadian $)	$42 690 400
94 170 000 kW.h buffer energy to Ontario Hydro @ 13.1 mills (4)	1 233 627
Total	$43 924 027

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(1) Assuming maximum fuel cost from Union at $2.3948/MCF and operation of Dow-Sarnia generation at the worst possible efficiency of 72%. Normally, all gas other than waste process gas used in Dow's Total Energy System, is purchased from Union under its Rate #7, Special Large Volume Industrial and Commercial Central Rate. The maximum rate chargeable by Union to this class of customer is $2.3948 per MCF. This rate was established under Ontario Energy Board Order 367-II dated March 23, 1979.

(2) Maximum quantity of energy export requested by Applicant from 1 June 1979 to 31 December 1982.

(3) Assuming an average of 3 MW on a continuous basis.

(4) Selling price calculated by split-saving formula using calculation of average incremental cost of generation at Dow - Sarnia of 12.58 mills/kW.h as given in Applicant's letter of 16 April 1979.

TERMS AND CONDITIONS OF EXPORT LICENCE

1. The term of this licence shall commence on the date of approval of this licence by the Governor in Council and shall end on the 31st day of December, 1982.
2. The class of inter-utility export transfer authorized hereunder is a sale transfer of interruptible energy.
3. The energy to be exported hereunder shall be transmitted over the international power lines of Ontario Hydro.
4. For the calendar year 1979, the quantity of energy that may be exported hereunder shall not exceed:

$$\frac{438 \text{ million kilowatthours} \times \text{the number of days the licence is in effect}}{365}$$

For each of the calendar years 1980, 1981 and 1982, the quantity of energy shall not exceed 438 million kilowatthours.

5. The Licensee shall not export energy hereunder unless it is surplus to the firm energy requirements of economically accessible Canadian markets at the time it is exported.

6. The Licensee shall interrupt or curtail the delivery of energy exported hereunder whenever and to whatever extent such energy is required to supply

   (a) any firm load within Canada, or

   (b) any Canadian electrical utility willing to buy part or all of the energy at the same price as that of the export, adjusted for any differences in the cost of delivery.

7. All exports of energy made by the Licensee hereunder shall be in accordance with the agreement dated the 2nd day of March 1979 between Dow Chemical of Canada, Limited and The Dow Chemical Company as amended in the Dow Chemical of Canada, Limited letter dated the 24th day of May 1979, and with the agreement between Ontario Hydro and Dow Chemical of Canada, Limited dated the 24th day of May, 1979.

8. The Licensee shall not, without the prior approval of the Board, amend, enter into any agreement in substitution for or in addition to, or terminate either of the agreements cited in Condition 7.

9. The price to be charged by the Licensee for energy exported hereunder as a sale transfer shall be the greater of,

   (a) 24.3 mills per kilowatthour in United States funds, or

(b) such other price as may be established from time to time in accordance with the escalation clause of the agreement dated the 2nd day of March 1979 between Dow Chemical of Canada, Limited, and The Dow Chemical Company as amended in the Dow Chemical of Canada, Limited, letter dated the 24th day of May, 1979.

10. In calculating the cost of production of energy exported under this licence, the incremental fuel cost used in any pricing formula shall be the greater of the export price of natural gas in Ontario at the nearest point of export or the maximum price which could be charged by Union Gas Limited.

11. The Licensee, within fifteen days after the end of each month comprised in the term of this licence, shall file with the Board a report in such form and detail as the Board may specify, setting forth for that month:

(a) the quantity of energy exported hereunder

(b) the price and the resulting revenue for (a)

(c) the quantity of buffer energy sold to Ontario Hydro

(d) the price and the resulting revenue for (c)

(e) the average total incremental cost of production for the month based on the higher of the export price of natural gas or the maximum price which could be charged by Union Gas Limited, stating separately the "Cost of Fuel" and "Other Costs".